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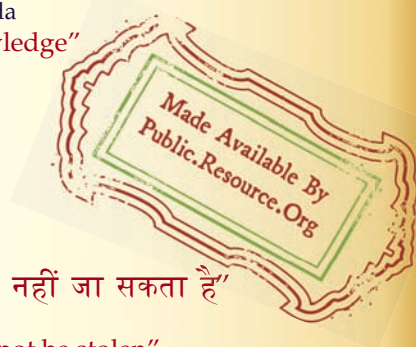
IS 6611 (1988): Symbols for rubbers and latices [PCD 13: Rubber and Rubber Products]



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*Indian Standard*  
SYMBOLS FOR RUBBERS AND LATICES  
( *First Revision* )

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BUREAU OF INDIAN STANDARDS  
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NEW DELHI 110002

# Indian Standard

## SYMBOLS FOR RUBBERS AND LATICES

### ( First Revision )

#### 0. FOREWORD

**0.1** This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards on 23 December 1988, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

**0.2** This standard was originally published in 1972. In this revision, some new symbols have been added and all symbols prescribed in this standard, have been updated in accordance with the latest international practice.

**0.3** The object of this standard is to provide standardized symbols for basic rubbers both in dry and latex forms for use in industry, trade

and government. These symbols have been accepted at the international level. It is not intended to conflict with but rather to act as a supplement to existing trade names and trade-marks.

**0.4** Technical papers or presentations, the name of the polymer should be used, if possible. The symbols can follow the chemical name for use in later references.

**0.5** This standard is based on ISO/DIS 1629-1985 'Rubbers and latices — Nomenclature' issued by the International Organization for Standardization (ISO).

#### 1. SCOPE

**1.1** This standard gives a general classification for the basic rubbers both in dry and latex form, based on the chemical composition of the polymer chain.

#### 2. CLASSIFICATION

**2.1** Rubbers, in both dry and latex forms, are classified and coded on the basis of the chemical composition of polymer chain in the following manner:

- M — Rubbers having a saturated chain of the polymethylene type
- N — Rubbers having nitrogen in the polymer chain
- O — Rubbers having oxygen in the polymer chain
- R — Rubbers having an unsaturated carbon chain, for example, natural rubber and synthetic rubbers derived at least partly from diolefins
- Q — Rubbers having silicon and oxygen in the polymer chain
- T — Rubbers having sulphur in the polymer chain
- U — Rubbers having carbon, oxygen and nitrogen in the polymer chain
- Z — Rubbers having phosphorus and nitrogen in the polymer chain

#### 3. GROUP DESIGNATIONS

**3.1** The 'M' group includes rubbers having a saturated chain of the polymethylene type. The following classification is used:

- ACM — Copolymer of ethylacrylate or other acrylates and a small amount of a monomer which facilitates vulcanization
- ANM — Ethylacrylate or other acrylate and acrylonitrile copolymer
- CM — Chloropolyethylene
- CFM — Polychlorotrifluoroethylene
- CSM — Chlorosulfonylpolyethylene
- EAM — Ethylene-vinyl acetate copolymer
- EPDM — Terpolymer of ethylene, propylene, and a diene with the residual unsaturated portion of the diene in the side chain
- EPM — Ethylene-propylene copolymer
- FPM — Rubbers having fluoro and fluoroalkyl or fluoroalkoxy substituent groups on the polymer chain
- IM — Polyisobutene

**3.2** The 'O' group includes rubbers having oxygen in the polymer chain. The following classification is used:

- CO — Polychloromethyloxiran ( epichlorohydrin elastomer )

ECO — Ethylene oxide (oxiran) and chloromethyloxiran (epichlorohydrin copolymer)

GPO — Copolymer of propylene oxide and allyl glycidyl ether

**3.3** The 'R' group, in both dry and latex forms, is defined by inserting, before the word 'rubber' the name of the monomer or monomers from which the rubber was prepared (except for natural rubber). The letter immediately preceding the letter 'R' signifies the diolefin from which the rubber was prepared (except for natural rubber). Any letter or letters preceding the diolefin letter signifies the comonomer or comonomers. The following classification is used:

ABR — Acrylate-butadiene rubbers

BR — Butadiene rubbers

CR — Chloroprene rubbers

IIR — Isobutene-isoprene rubbers

IR — Isoprene rubbers, synthetic

NBR — Acrylonitrile-butadiene rubbers

NCR — Acrylonitrile-chloroprene rubbers

NR — Isoprene rubbers natural

PBR — Vinylpyridine-butadiene rubbers

SBR — Styrene-butadiene rubbers

SCR — Styrene-chloroprene rubbers

SIR — Styrene-isoprene rubbers

NIR — Acrylonitrile-isoprene rubbers

PSBR — Vinylpyridine-styrene-butadiene rubbers

NOTE — Carboxylic rubbers are identified by the prefix letter 'X'.

**3.3.1** Rubbers having substitute carboxylic acid groups (COOH) on the polymer chain are classified as follows:

XBR — Carboxylic-butadiene

XCR — Carboxylic-chloroprene

XNBR — Carboxylic-acrylonitrile-butadiene

XSBR — Carboxylic-styrene-butadiene

**3.3.2** Rubbers containing halogen on the polymer chains are classified as follows:

BIIR — Bromo-isobutene-isoprene

CIIR — Chloro-isobutene-isoprene

**3.4** The 'Q' group, in both dry and latex forms, is defined by inserting the name of the substituent group on the polymer chain prior to

silicone designation. The following classification is used:

FMQ — Silicone rubbers having both methyl and fluorine substituent groups on the polymer chain

FVMQ — Silicone rubbers having methyl, vinyl and fluorine substituent groups on the polymer chain

MQ — Silicone rubbers having only methyl substituent groups on the polymer chain, such as dimethyl polysiloxane

PMQ — Silicone rubbers having both methyl and phenyl substituent groups on the polymer chain

PVMQ — Silicone rubbers having methyl, vinyl and phenyl substituent groups on the polymer chain

VMQ — Silicone rubbers having both methyl and vinyl substituent groups on the polymer chain

NOTE — Insert initial for substituent group(s) on polymer chain to the left of the code letter for rubber with silicone and oxygen in the backbone (Q) in descending order of percent present, namely, largest nearest.

**3.5** The 'U' group includes rubbers having carbon, oxygen and nitrogen in the polymer chain. The following classification is used:

AFMU — Terpolymer of tetrafluoroethylene-trifluoronitrosomethane and nitroso-perfluorobutyric-acid

AU — Polyester urethane

EU — Polyether urethane

**3.6** The 'T' group includes rubbers having carbon, oxygen and sulphur in the polymer chain. The following classification is used:

OT — A rubber having either a  $-\text{CH}_2-\text{OH}_2-\text{O}-\text{CH}_2-\text{O}-\text{CH}_2-$  group or occasionally an R group, where R is an aliphatic hydrocarbon, not usually  $-\text{CH}_2-\text{CH}_2-$ , between the polysulfide linkages in the polymer chain

EOT — A rubber having either a  $-\text{CH}_2-\text{CH}_2-\text{O}-\text{CH}_2-\text{O}-\text{CH}_2-$  group and R groups which are usually  $-\text{CH}_2-\text{CH}_2-$  but occasionally other aliphatic groups between the polysulphide linkages in the polymer chain

**3.7** The 'Z' group includes rubbers having phosphorus and nitrogen in the polymer chain.

The following classification is used:

FZ — A rubber having a  $-P=N-$  chain and having fluoroalkoxy groups attached to the phosphorus atoms in the chain

PZ — A rubber having a  $-P=N-$  chain and having aryloxy (phenoxy and substituted phenoxy) groups attached to the phosphorus atoms in the chain

rubber-like properties at room temperature whilst the rubber is in the unvulcanized state. For example:

YSBR — A block copolymer of styrene and butadiene

YXSBR — A block copolymer of styrene and butadiene containing carboxylic acid groups on the polymer chain

#### 4. THERMOPLASTIC RUBBERS

4.1 Designations of rubbers in 3 shall be preceded by the letter Y if the rubbers consist essentially of polymers having a block, graft, segmented or other structure that imparts

4.2 The designation Y shall not be assigned to materials whose rubber-like properties in the unchanged state rely on blending of polymers or on any other compounding techniques. In such cases, each component of the material shall be included in the designation.



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